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New Polydesmoidea (Diplopoda) from South Africa.

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With 51 Text-figures.

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INTRODUCTION.

A NUMBER of new Polydesmid millipedes belonging to the Sphærotrichopidæ are described from Natal-Zululand and the Transvaal, two new species of Strongylosomidæ from Moçambique and a new species of Gomphodesmidæ from Nyasaland.

The curious anomaly in the distribution of the genus *Gnomeskelus* Attems of which one species was believed to live in Hawai, all the remainder in South Africa, has been explained, as the single " Hawaiian " species is now shown to be of South African origin.

A new species of *Harpethrix* has been described from the Sandstone caves at the top of Table Mountain, Cape Town. This is the first true cave-living (troglobiont) Diplopod to be found in South Africa.

Family STRONGYLOSOMIDÆ.

Genus *Orthomorpha* Attems.

Orthomorpha gorongozæ n. sp. Text-figs. 1–5.

Holotypes : 1 ♂, 1 ♀, paratypes 15 ♂ ♀ (N.M. 6797), Gorongoza Mt., P.E. Africa, at 2,500 ft. alt., collected R. F. Lawrence, September 1957.

♂.—*Colour* rich reddish-brown, metazonites with blackish posterior margins, antennæ reddish-brown ; sternites, ventral surface in general and legs, white to cream, the three distal leg segments reddish-brown ; vertex of head bisected by a fine black line.

Antennæ not reaching far beyond posterior margin of segment III ; keels of body very poorly developed, merely blunt ridges not ending in a tooth but in a short blunt angle, clearly separated from the rest of the tergites by a well-defined groove, lateral margins of tergites seen from above rounded ; collum with two transverse rows of small fine setæ, anterior and posterior tergites with one row, those in the middle without setæ. Sternite V with a large quadrate plate as in text-fig. 2.

Legs.—Anterior legs somewhat shorter than posterior ones; all tibiæ and tarsi with a brush of modified setæ, text-fig. 5, prefemur ventrally with about 14 short bluntly-pointed setæ as in text-fig. 4 (of leg XIII) ; claw of leg XIII as in text-fig. 3.

Gonopods as in text-fig. 1, seen from the aboral (posterior) side.

♀.—Differing from the ♂ in the relatively slightly stouter body.

Dimensions.—Total length of ♂ 12, of ♀ 11·8 mm. ; greatest width of ♂ 1·3, of ♀ 1·3 mm.

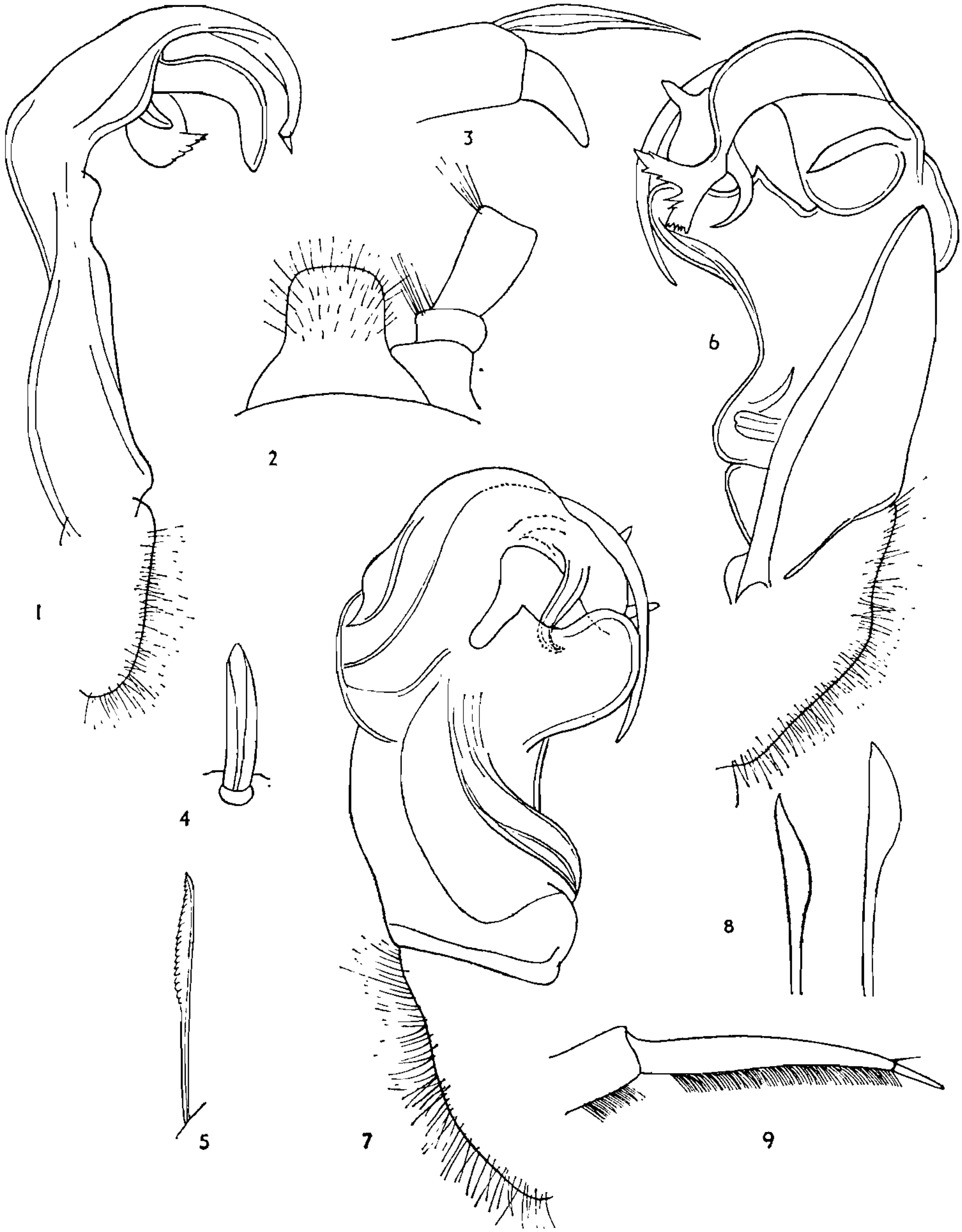
The species does not appear to resemble particularly any of the previously described forms of the genus but should probably be placed in Attem's subgenus *Kalomorpha*.

Genus *Habrodesmus* O. F. Cook.

Habrodesmus pamelæ n. sp. Text-figs. 6–9.

Holotype : 1 ♂ (N.M. 7114) Blantyre, Nayasaland, collected by Pamela Stuckenberg, January 1958.

Colour of metazonites yellow with a brownish tinge, prozonites yellow;



TEXT-FIGS. 1–9.

Figs. 1–5. *Orthomorpha gorongozæ* n. sp. ♂ : 1, gonopod (aboral view) ; 2, sternite V ; 3, apex of tarsus XIII ; 4, ventral seta of prefemur XIII ; 5, modified seta from ventral brush of tarsus XIII. Figs. 6–9. *Habrodesmus pamelæ* n. sp. ♂ : 6 and 7, gonopod from inner and outer sides respectively ; 8, modified setæ from tarsus VI ; 9, apex of tibia and tarsus of leg VI.

head yellow, brown in upper half (above the antennæ) becoming diluted towards the posterior border; antennæ brown, becoming blackish brown towards the apex, contrasting strongly with the lighter body somites; legs yellow, the two or three distal segments light brown dorsally.

Head.—Antennæ with very long slender segments, reaching beyond the posterior margin of segment VI.

Body.—Keel of segment II below the level of collum, but not or only a very little below that of the following segments, keels poorly developed, rounded posteriorly, the pores very small; segment II as wide as collum, a very little wider than III. Dorsal surfaces of metazonites finely creased, with minute irregular grooves, thus not shiny, no bristles or setæ, their posterior margins quite straight, lacking small accessory teeth.

Legs of posterior segments very long and slender, femur and tarsus of XII longest of the leg segments, subequal; anterior legs shorter, as far as XI or XII with a well-defined dense brush of regular close-set modified setæ as in text-fig. 9, the hairs lamellate and expanded apically, text-fig. 8; sternite V with a small quadratiform plate between the anterior pair of legs; its margin slightly indented as in *H. rhodesianus* Attems (1928, Pl. V, fig. 107) but comparatively smaller than in this species. Most of the sternites behind the gonopods with one or two pairs of pointed cone-shaped tubercles, the posterior pair largest in segment XVI, the anterior pair diminishing in size anteriorly, absent from VII to XII.

Gonopods of complex structure, as in text-figs. 6, 7, seen from inner and outer sides respectively, short and thick-set.

Dimensions.—Total length of ♂ about 27 mm., greatest width 3 mm.

The species seems related to *H. rhodesianus* Attems from Salisbury in the shape of the gonopods, the details of the legs and sternites. It certainly resembles *H. massai* Cook and also Turk's subspecies *nyassæ* (1956, p. 737), differing from both forms in the colouring, absence of accessory teeth on the posterior margins of the metazonites and the details of the gonopods (in *nyassæ*, no figure of *massai* being given). Cook's species, based on a ♂ in the Berlin Museum (1898, p. 702), doubtlessly came from the northern (Tanganyika) end of Lake Nyasa which is a considerable distance from Blantyre.

Family GOMPHODESMIDÆ.

Genus *Neodesmus* Cook.

Neodesmus mossambicus n. sp. Text-fig. 10.

Holotype: 1 ♂, paratypes 2 ♂ (N.M. 7218), Salone forest near Chupanga on the Zambesi, Maromeu distr., P.E. Africa, collected by Pamela Stuckenberg, December 1960.

Colour.—Body uniformly dark brown with reddish tinge, the keels distinctly lighter, legs light brown ; in general no markings or variegations.

Head.—Antennæ short, not or hardly surpassing the posterior margin of segment II.

Body.—Tergites finely creased, leather-like but not shiny ; lateral margin of collum bluntly and narrowly triangular, lateral keels of segments I–VI, seen from above, bluntly quadrangular ; from segment XI backwards the postero-lateral angle of metazonites bluntly pointed, becoming progressively a little more so posteriorly ; keels well developed, the large pores situated just posterior to the middle of the keel, opening upwards and laterally ; a pore present on tergite XI. Sternite VI with a large bluntly triangular or cone-shaped setose process, coxæ of both leg-pairs of the segment elongate, a small blackish round process at their inner (upper) apex ; sternite V normal, XV quite without a process of any kind.

Legs of uniform length throughout, prefemur I–VI with a tuft of long bristles below at its apex, tarsi with a dorsal fringe of setæ ; large distinct rounded pads on legs of segments II–VI, those of segments VII–XIX completely without.

Gonopods with 4 distinct bends, the telepodite much widened at the beginning of the distal half and hollowed out ; after the second bend a complex arrangement of large teeth, two (a short triangular and longer more slender tooth) pointing backwards towards the femur, a large truncate process just proximal to these teeth abutting against the femur, ending in two small triangular teeth ; on the opposite side of the gonopod another long slender tooth directed downwards and more or less parallel to the main axis of the telepodite, text-fig. 10.

Dimensions.—Total length of body 24, greatest width 4·5 mm.

I attribute this species to the genus *Neodesmus* since it completely lacks a sternal process on segment XV and has a well-developed spoon-like excavation at the widely expanded and flattened commencement of the distal half of the gonopod ; otherwise it appears to differ little from *Gomphodesmus.* The long whip-like gonopod with its four sinuate bends is quite distinct from that of any species of *Gomphodesmus*, *Neodesmus* or *Aulodesmus* ; it is also different from *N. juvenis* Cook, the only other species of *Neodesmus* described from Moçambique.

Genus *Ulodesmus* Cook

Ulodesmus propinquus n. sp. Text-figs. 11–13.

Holotype : 1 ♂, paratype 1 ♂ (N.M. 7776), Magoebaskloof, Transvaal, collected at 4,000 ft. alt., R. F. Lawrence, March 1960.

Colour dull cream to yellow.

Body.—Collum with its lateral margin bluntly triangular, its anterior margin straight, posterior margin slightly curved; segment II a little wider than collum, III–V progressively a little wider than II; pre-gonopodal tergites rounded at the sides, post-gonopodal ones with the postero-lateral angle a little pointed in the posterior segments, pores of keels directed more upwards than outwards, situated a little posterior to the middle of thickened edge of the keels in anterior segments but passing progressively further backwards in the posterior ones; tergites strongly arched, the keels bent slightly upwards at the sides, their dorsal surfaces with minute fine irregular creasing, giving them a leather-like appearance. Sternite VI with a flat lamellate process between the anterior legs as in text-fig. 13, the prefemur of both pairs of legs with a round basal projection dorsally; remaining sternites without processes but their surfaces roughened with small sand-like granules, VIII–X with long stiff bristles, from XI backwards with few or none.

Legs.—Tarsi in segments II–VI with a rounded pad beneath the claw, legs behind the gonopodal segment without.

Gonopods strongly resembling those of *U. micramma* Cook but differing in the details of the tooth structure, text-fig. 11, seen from outer side, text-fig. 12 seen from behind.

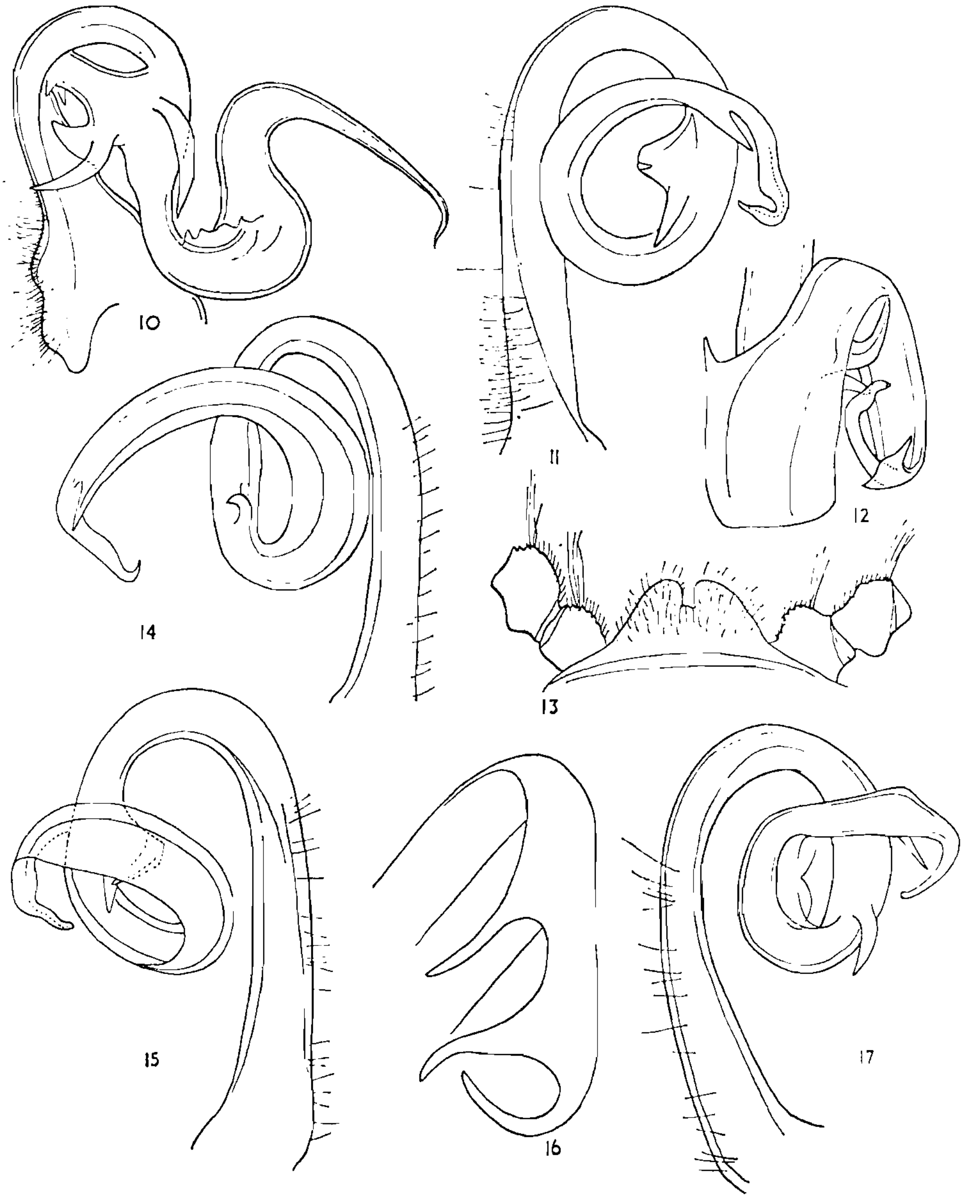
Dimensions.—Total length of body 23, greatest width 4·5 mm.

The new form is remarkable in having its closest resemblance to *U. micramma* Cook, a species which occurs in Natal, at or near sea level. It differs in the greater width of the body as well as in having a well-formed spine on the inner side of the gonopod, a little proximal to the two large spines on the outer side distal to the first bend; this spine is absent in the figures of Cook's type.

Ulodesmus micramma Cook

U. micramma Cook, 1899, Proc. U.S. Nat. Mus., **21**: 690, Pl. XVI, Fig. 1.

Cook described his species from Durban and "Maritzburg" specimens without designating the locality of the type; this is, however, more likely to be Durban than Pietermaritzburg. Four figures have been given of the gonopods of the species, the figure of the type by Cook, and three by Attems; all of them are different. Attem's figure in 'Ann. Natal Museum', **7**, 1934, Pl. XXV, fig. 38, are quite different from those of Cook's types and represent a distinct form; the locality of the specimen on which he based his drawing was unfortunately not stated; Attem's two other figures ('Das Tierreich', 1938, p. 425, fig. 467, and 'Ann. S. Afr. Mus.', **26**, 1928, Pl. VIII, fig. 190) can be considered to represent the same form though differing in a few details; the specimens on which these figures were based came in all probability from Kranskop and represent in my opinion another subspecies of *micramma*; neither of these forms can be named, as the specimens on which the figures of the gonopods were based have not been located. We have a third quite



TEXT-FIGS. 10–17.

Fig. 10. *Neodesmus mossambicus* n. sp. ♂; gonopod from outer side. Figs. 11–13. *Ulodesmus propinquus* n. sp. ♂: 11, gonopod from outer side; 12, apical half of telepodite from behind (enlarged); 13, sternite VI. Figs. 14, 15. Gonopods of *U. micramma bothæ* n. subsp. ♂ and *U. micramma zuluensis* n. subsp. ♂, respectively, from outer side. Figs. 16, 17. *Ulodesmus debilis* n. sp. ♂: 16, apex of gonopod from above; 17, whole gonopod from outer side.

distinct form from Hluhluwe Game Reserve, Zululand, probably the same as that identified by Attems, loc. cit., 1934, p. 472, from Dukaduka (= Dukuduku forest), Zululand, as *micramma* ; a fourth from Botha's Hill, half-way between Durban and Pietermaritzburg. The last two forms I name *micramma zuluensis* (N.M. 5046), 54 ♂ ♀, Hluhluwe Game Reserve, text-fig. 15, and *micramma bothæ* (N.M. 6806), 5 ♂ from Botha's Hill, Natal, text-fig. 14.

A Key to the Subspecies of *U. micramma* Cook.

1. Inner side of telepodite with a large tooth distal to first bend
form of *micramma* figured by Attems ('Ann. Natal Mus.', VII, Pl. XXV, fig. 38)
— Inner side of telepodite without a tooth 2
2. A tarsal process on outer margin of telepodite 3
— No tarsal process, telepodite before the apical bend with a transparent lamelliform widening 4
3. Outer tooth distal to the first bend with accessory teeth ; tarsal process simple, tooth— or blade-like . . . . *micramma micramma* Cook
— Outer tooth distal to the first bend simple, tarsal process serrated
form of *micramma* figured by Attems from Kranskop ('Ann. S. Afr. Mus. XXVI, Pl. VIII, fig. 190)
4. A single outer tooth distal to the first bend ; just before the final bend a large sharp tooth . . . . *micramma bothæ* n. subsp. (text-fig. 14)
— Two outer teeth distal to the first bend ; no tooth just before the final bend
micramma zuluensis n. subsp. (text-fig. 15)

Ulodesmus debilis n. sp. Text-figs. 16, 17.

Holotypes : 1 ♂, 1 ♀ from 78 ♂ ♀ (N.M. 7725), Louis Trichardt, on mountain slopes at about 2,500 ft. alt., collected R. F. Lawrence, February 1960.

♂.—*Colour* dirty white.

Collum and tergites shiny with only microscopic creases. Collum with the sides forming a blunt triangle ; lateral margin of segment V passing below those of II–IV, the thickened rim much longer and wider than in these segments, the pore situated in the middle of the thickening ; keels in middle and posterior segments distinctly pointed behind, their margins seen from above quite strongly curved, the keels appearing to be bent backwards ; keels of metazonite XI without a pore. Sternite VI with a low wide lamella between anterior legs, its free margin straight but with a minute V-shaped notch in the middle ; the prefemur of both legs of this segment without a dorsal rounded process basally ; neither sternite VIII nor XVI with processes.

Legs anterior to gonopodal segment without a tarsal pad below the claw (legs II–VII) similar to the post-gonopodal legs.

Gonopods as in text-fig. 17 seen from the outer side ; a large fairly slender simple spine just before the second bend, but inner spine only a laminate pointed process ; apex of telepodite flattened and divided into 3 curved slender prongs, text-fig. 16, seen from above and enlarged.

Dimensions.—Total length of ♂ 11, of ♀ 11 mm. ; greatest width of ♂ 2·6, of ♀ 2·8 mm.

The species does not appear to be related to any other species of the genus, differing in its small size, the absence of pads on the anterior tarsi and the trifurcate division of the apex of telepodite. The absence of a pore on segment XI does not seem to be a distinguishing character as it is present in some of the paratype specimens, both ♂ and ♀.

Family SPHÆROTRICHOPIDÆ.

Genus *Harpethrix* Attems.

Harpethrix cæca n. sp. Text-figs. 18–21.

Holotype : 1 ♂ (B. 7975), Kalk Bay Caves, Table Mt., Cape Province, collected R. F. Lawrence, July 1932.

Colour.—Uniform pale yellow.

Keels of tergites very wide, flat, and almost transparent, the postero-lateral angles rectangular but rounded, a little less than a right angle in segments XVII and XVIII, quite rounded, only those of V and the last two or three tergites bluntly pointed.

All setæ bacilliform or hardly perceptibly widened towards their apices, rising from small round tubercles ; collum with a row along the anterior and posterior margins, two shorter, less regular rows between these ; tergites with 3 transverse rows, the posterior one regular, with 6–7 setæ, the two anterior rows less regular, with fewer setæ ; lateral margin of keels weakly notched, not incised, with 4 setæ on all tergites ; in addition 2 (on some of the posterior segments 3) setæ near the margin, text-fig. 18, between these and the central portion of tergite 2 or 3 more. Marginal fringe of metazonites differing from those of *H. plana* in having the minute teeth distinctly separated, unequal and irregular, text-fig. 21.

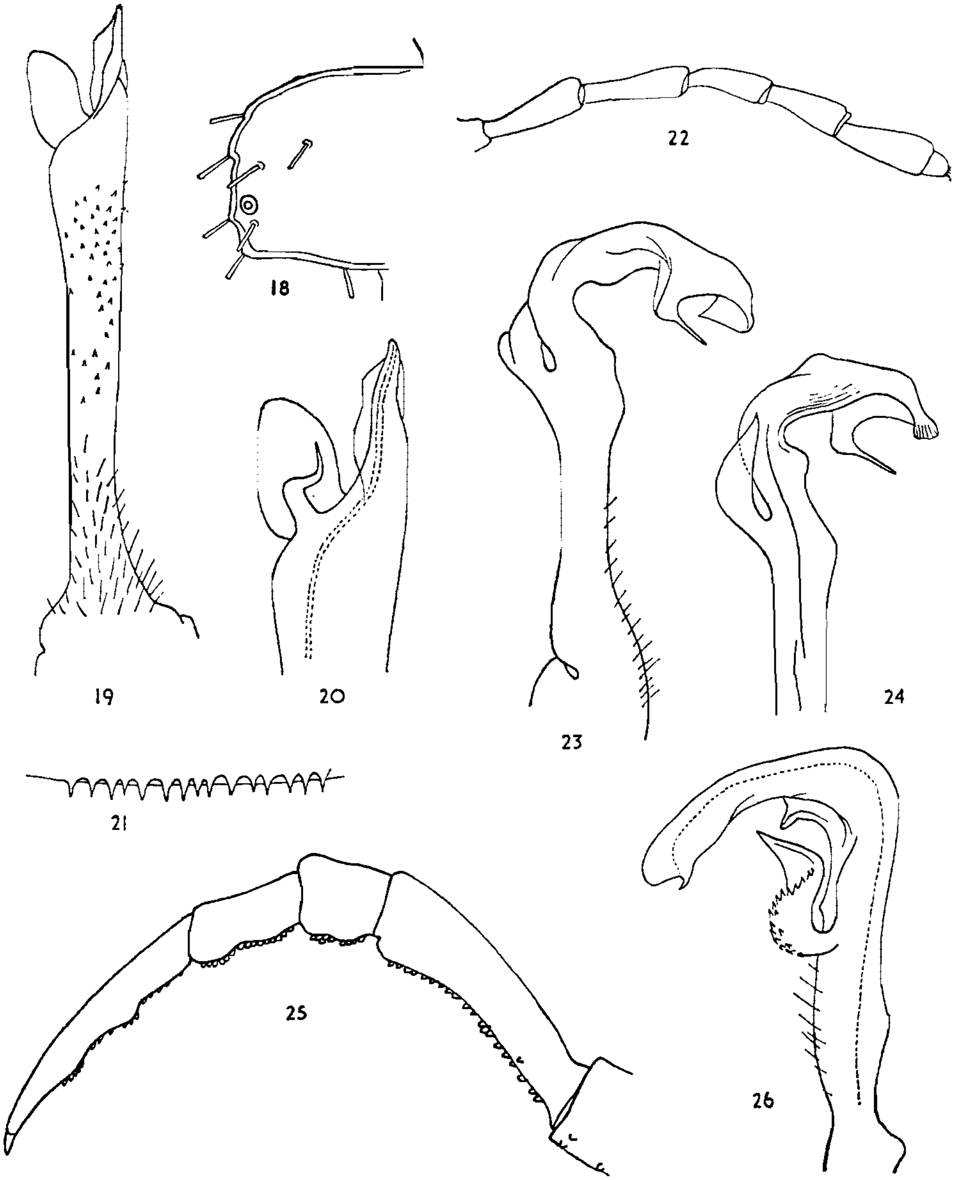
Gonopods more less straight, differing markedly in shape from those of *plana* Attems, the tooth-like cones, only present on the aboral (anterior) surface, distinctly smaller ; apex of tibio-tarsus with a large flattened, leaf-like, almost transparent process on the inner side, text-fig. 19 ; apex of gonopod seen from behind (oral view) as in text-fig. 20, somewhat enlarged.

Dimensions.—Total length 16 mm.

Further material.—From Wynberg Cave, summit of Table Mt., 1 ♂ (B. 7494), collected K. H. Barnard, May 1929 ; from the same locality 1 ♀ (B. 7732) collected R. F. Lawrence, March 1931 ; 3 broken ♀ from Devil's Pit Caves, Table Mt., collected 13.vi.54. The ♀ from Wynberg Cave (B. 7732) measures 13 mm. but appears to be considerably contracted.

Remarks.—The species differs from Attems *plana*, which was collected in mountainous territory near Wellington, Cape, in the gonopods and in having 4 marginal setæ on the keels of the tergites instead of 3.

In Attems' fig. 510 (1928) the setæ appear pointed and hair-like but I



TEXT-FIGS. 18–26.

Figs. 18–21. *Harpethrix cæca* n. sp. ♂ : 18, left half of segment VII from above ; 19, gonopod, aboral view ; 20, apex of same, oral view (enlarged) ; 21, marginal fringe of metazonite VIII. Figs. 22–25. *Gomeskelus tereticornis* n. sp. ♂ : 22, antenna ; 23, gonopod, aboral view ; 24, the same, oral view (enlarged) ; 25, leg XIII. Fig. 26. *Gnomeskelus subterraneus* n. sp. ♂ ; gonopod, aboral view.

think this is incorrect (Attems does not describe their shape); in *cæca* the bristles of the tergites are very like those figured by Schubart for his immature ♂ of this genus (1956, p. 78, fig. 52), which doubtless represents a third species of *Harpethrix*. The cave form differs from Schubart's ♂ in having only 4 marginal setæ on the keels instead of 5 or 6 such setæ; the postero-lateral angles of the keels in the posterior half of the body are acutely angled and quite strongly pointed in Schubart's specimen which was captured near Hermanus among tufts of moss in an open field.

The caves at the top of Table Mountain are well known for the many highly distinctive troglobionts which live in them. Among the arthropods, Opiliones, Pseudoscorpions, insects and a number of crustacea have been described while cave acarina are also known. An Onycophoran, the only known species which is both blind and unpigmented, also lives in these caves but thus far no myriopods have been described; there seems to be reason to believe that *Harpethrix cæca* is the only representative of its class; it lives in total darkness in the deeper caverns of the Table Mountain series.

Genus *Gnomeskelus* Attems.

Gnomeskelus tereticornis n. sp. Text-figs. 22–25.

Holotypes: 1 ♂, 1 ♀, paratypes 1 ♀, 1 ♂ (N.M. 8149), Ngomi Forest, Zululand, collected R. F. Lawrence, December 1960.

♂.—*Colour.* In general brown, metazonites in the middle with a large blackish triangular marking pointed anteriorly, lateral margins of keels and posterior margins of metazonites narrowly bordered blackish, antennæ blackish-brown, darker distally; legs brown below, blackish-brown dorsally.

Dorsal surface.—Antennæ very long and slender, especially segment III which is longer than IV or V. Collum and body segments with extremely minute, fine bristles, collum with 3 transverse rows of these, remaining segments with 1 row of about 6 bristles anterior to the metazonal suture; postero-lateral angles of keels ending in a very strong sharp tooth on all segments, from X or XI backwards with a very small accessory tooth on the posterior margin of the segment adjacent to the main tooth, from XII backwards with 2, from XVI backwards with 3 such teeth; caudal spine long and fairly slender.

Legs.—Femur and three distal segments of legs in middle of body with transparent, blunt cone-shaped nodules ventrally, femur with an irregular row of 27, post-femur, tibia and tarsus with two more or less rounded processes, text-fig. 25, on which the cones are more thickly clustered, these very low and indistinct on the post-femur and tibia.

Gonopods as in text-fig. 23, anterior view, text-fig. 24 posterior view, characterized by the very large, wide, blade-like tibio-tarsus which passes behind the telepodite and the complete absence of a parsolanomerit, its place being apparently taken by a curious thickening of the inner margin of the gonopod femur.

♀.—In all respects resembling the ♂ but the body relatively stouter, the accessory teeth of the posterior margins of the metazonites fewer and smaller, legs normal.

Dimensions.—Total length of ♂ 25, of ♀ 24 mm.

Gnomeskelus subterraneus n. sp. Text-figs. 26, 27.

Holotype : 1 ♂, paratypes 2 ♂ (N.M. 7835), Nhlazaan Mt., near Elandskop, Natal in an ants nest, collected R. F. Lawrence, July 1960.

Colour.—Entirely white.

Dorsal surface. Antennæ moderate, segment III not much longer than IV and V, shorter than VI which is the longest and widest of the segments.

Body somites with very short microscopic setæ, collum with irregular rows of these, metazonites of the body segments with 3 transverse rows, the middle considerably nearer to the posterior than to the anterior row. Keels obsolete, the postero-lateral angles without a tooth, the angle blunt in anterior half, pointed in posterior half of body.

Legs short as in text-fig. 27 (leg XIII), prefemur with a row of about 7 cones, ventral surface of femur rather irregular in outline, the cones not forming a continuous row, text-fig. 27.

Gonopods.—As in text-fig. 26 seen from the oral (posterior) side, no tibiotarsus but the parsolanomerit large and unusual in being spiculated.

Dimensions.—Total length 9 mm.

The species differs markedly from all others in the shape of the gonopods ; in my key (1953, p. 306) it seems to come nearest to *processiger* but is much smaller than this species besides differing from it in the detailed structure of the gonopods and legs. The gonopods rather resemble those of *serratus* though the parsolanomerit in this, as in most other species, is directed downwards, that of *subterraneus* upwards.

Gnomeskelus larvatus n. sp. Text-fig. 28.

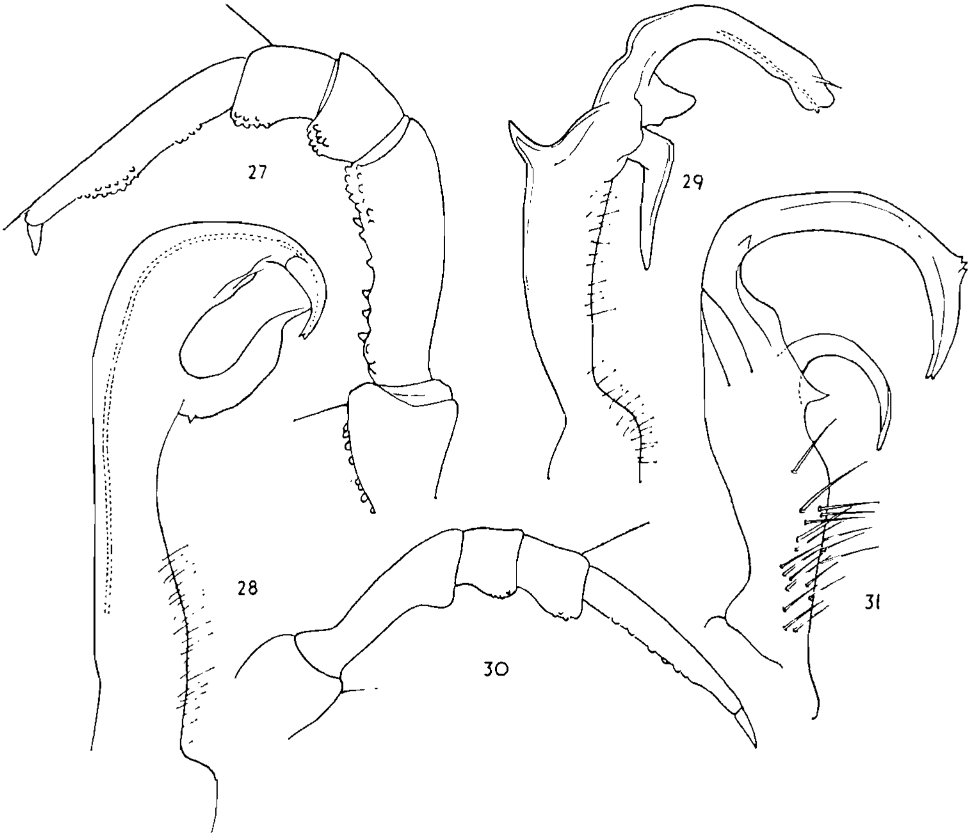
Holotypes : 1 ♂, 1 ♀, paratypes 15 ♂ ♀ (N.M. 8169), Town Bush, Pietermaritzburg, collected R. F. Lawrence, October 1960.

♂.—*Colour* light reddish-brown without markings.

Dorsal surface.—Antennæ reaching as far as posterior margin of segment IV, segment III a little longer than IV.

Most metazonites with 3 transverse rows of short microscopic setæ ; keels obsolete, from XI backwards the postero-lateral angle a small sharp tooth which increases in size posteriorly.

Legs as in *G. glaber* but femur, post-femur and tibia more thickset, the two



TEXT-FIGS. 27–31.

Fig. 27. *Gnomeskelus subterraneus* n. sp. ♂; leg XIII. Fig. 28. *Gnomeskelus larvatus* n. sp. ♂; gonopod, aboral view. Fig. 29. *Gnomeskelus krausi* n. sp. ♂; gonopod, aboral view. Figs. 30, 31. *Gnomeskelus maritimus* n. sp. ♂: 30, leg XIII; 31, gonopod, aboral view.

latter segments with a few cones at their ventro-distal apices, tarsus with a cluster on a low protuberance in distal half, proximally to these a few scattered cones ventrally.

Gonopods as in text-fig. 28, no tibio-tarsus, parsolanomerit large and upwardly curved.

♀ not differing from the ♂ except that the body is a little wider, the legs relatively thicker.

Dimensions.—Total length of ♂ 8·5, of ♀ 7 mm.

Further material.—5 ♂ ♀ (N.M. 7841), Town Bush, collected J. Y. Lawrence, July 1960; 25 ♂ ♀ (N.M. 8168) with the same data as the types.

Gnomeskeleus krausi n. sp. Text-fig. 29.

Holotypes, 1 ♂, 3 ♀ (N.M. 8151) Ngomi Forest, Zululand, collected R. F. Lawrence, December 1960.

♂.—*Colour*. Antennæ blackish, tergites variegated blackish-purple, an ill-defined dark marking in middle of metazonites, their posterior margins with a distinct blackish, fairly narrow arcuate border connecting with a similar but slightly wider border at the sides of the metazonites; pores situated in a small, round. clearly defined cream spot surrounded by blackish-purple pigment; legs variegated blackish-purple.

Dorsal surface.—Antennæ fairly short, reaching or a little surpassing posterior margin of somite III, third segment distinctly shorter than VI, II considerably longer than III, subequal to VI; bristles of metazonites minute and fine but not microscopic, collum with 2 transverse rows, remaining tergites with 1 (penultimate segment with 2). Keels obsolete, ending posteriorly in a minute tooth, the postero-lateral angle, however, fairly sharp, rectangular.

Legs.—Prefemur ventrally with a row of 5 transparent cones, femur with 0, post-femur and tibia with a few clustered in distal half; tarsus long and slender, a slight swelling in the middle ventrally with a few indistinct cones, otherwise without.

Gonopods as in text-fig. 29, the apex of the telepodite with a small spine, below it a small rounded lamella, through which the sperm canal passes.

♀.—The ♀ does not differ from the ♂ in colouring and is, as usual, slightly more thickset in proportion to its length.

Dimensions.—Total length of ♂ 11·2, of ♀ 9·6 mm.

This species is named for Dr. O. Kraus, the eminent myriopod specialist of the Forschungs Institut Senckenberg, at Frankfurt am Main.

Gnomeskelus maritimus n. sp. Text-figs. 30, 31.

Holotypes: 1 ♂, 1 ♀, paratypes 8 ♂ ♀ (N.M. 7855), Sheffield Beach, Umhlali, Natal, collected R. F. Lawrence, October 1960.

♂.—*Colour* of legs, antennæ and body uniform light brown without variegated markings, posterior margins of metazonites a little darker.

Dorsal surface.—Antennæ short, falling short of posterior margin of metazonite III; segment III much shorter than VI, about two-thirds, also shorter than II, segments IV and V only half as long as VI or a little more. Most tergites with transverse rows of microscopic setæ, fine and very short, collum with 4 rows. No keels or teeth at the postero-lateral angles of the metazonites, these, however, pointed and more or less rectangular.

Legs as in text-fig. 30 (leg XIII), without cones, these replaced by very low indistinct rounded nodules which are, like the cones on other species, smooth and transparent; femur, post-femur and tibia with a rounded swelling at their ventral apices which appears to be covered with a few low nodules; tarsus fairly short, both ventral and dorsal margins irregular due to a row of low, round nodules.

Gonopods as in text-fig. 31, apex of canal branch of telepodite with a minute cleft, the opening of the canal, the course of which is quite distinct. The gonopods in general like those of *circulipes* Verhoeff and its related species but a large, blade-like tibio-tarsus is present, pressed flat against the aboral surface of the femur where it is difficult to see; the basal two-thirds of the femur much more incrassate than in *circulipes* or its allies. The species is peculiar in having a number of long setæ implanted on the basal third of femur, the distal one isolated.

♀.—Not differing from the ♂ except in sexual characters and thicker appearance.

Dimensions.—Total length of ♂ 8 mm., of ♀ 5·8 mm.

Gnomeskelus gonarthrodus n. sp. Text-fig. 32.

Holotypes: 1 ♂, 1 ♀ (N.M. 8147), Cathedral Peak, collected B. Stuckenberg, February 1959.

♂.—*Colour.* Body uniform light yellow-brown, legs cream yellow, antennæ yellow-brown.

Dorsal surface.—Antennæ short, segment III distinctly shorter than VI, a little shorter than II. Collum with more than 2 irregular rows of small fine but not microscopic bristles, metazonites with 2 transverse rows each. Keels moderately well developed, postero-lateral angle with a strong but short tooth.

Legs.—Prefemur of leg XIII with 8–9 cones ventrally, femur with 10 or 11 widely spaced cones occupying its whole length, post-femur with 1–2, tibia with 2–3, tarsus fairly long and slender with a row of about 15 cone-shaped setæ occupying a contiguous row, the last fifth of tarsus without cones but with 3 long stout setæ, longer than the one above the claw.

Gonopods as in text-fig. 32, aboral view, the terminal portion of telepodite distal to the parsolanomerit separated by a suture or pseudo-articulation from the proximal portion of the gonopods; differing in this respect and in the detailed structure of the gonopod from any other known species. There is no sign of a tibio-tarsus.

♀.—Similar to the ♂ but the legs a little shorter.

Dimensions.—Total length of ♂ 10, of ♀ 7·5 mm.

Gnomeskelus arator n. sp. Text-figs. 33–35.

Holotypes: 1 ♂, 3 ♀ (N.M. 7791), Magoebaskloof, Transvaal, at 4,500 ft. altitude, collected R. F. Lawrence, February 1960.

♂.—*Colour.* Metazonites blackish-brown, concealed portion of prozonite whitish ; antennæ blackish-brown, legs very light reddish-brown, sternites a little darker.

Dorsal surface.—Antennæ reaching to beyond posterior margin of metazonite V, segment III longer than II, much the longest of all segments, V and VI subequal. Metazonite II only a little wider than collum, II, III and IV subequal in width. Keels strong but postero-lateral angles only pointed in anterior segments, produced into a short pointed tooth in last 7 or 8 tergites ; 1 or 2 minute accessory teeth on the posterior margin of metazonites adjacent to the postero-lateral angle, from segment V backwards ; metazonites with a row of 6 fine, but not short setaæ near their anterior margins, collum with 3 transverse rows, dorsal surface of tergites smooth, shiny, with minute leather-like creases.

Legs.—Tarsus of leg VI with at least 5 closely packed rows of cones along entire ventral surface, except a small portion at base and apex ; tibia and postfemur similar, femur with 2 irregular rows of well-separated cones, prefemur with contiguous rows as on tibia in distal half ; all these cones round or oval and finely striated as in those of *G. rudebecki* Lawrence (1959, fig. 4*e*). Leg XIII with all segments longer and relatively more slender than in anterior legs, tarsus with 2 very slight projections, text-fig. 35, but ventrally without cones, tibia with 4 widely separated cones in distal half, post-femur with 7, femur with a row of 15 widely separated cones occupying almost its whole length, prefemur with a row of 8 in distal two-fifths.

Gonopods resembling those of *rudebecki* to which the species seems fairly closely related, the short tibo-tarsus similar, differing only in the general shape of the canal branch and parsolanomerit, text-figs. 33 (aboral view) and 34.

♀.—As in ♂ but the body wider.

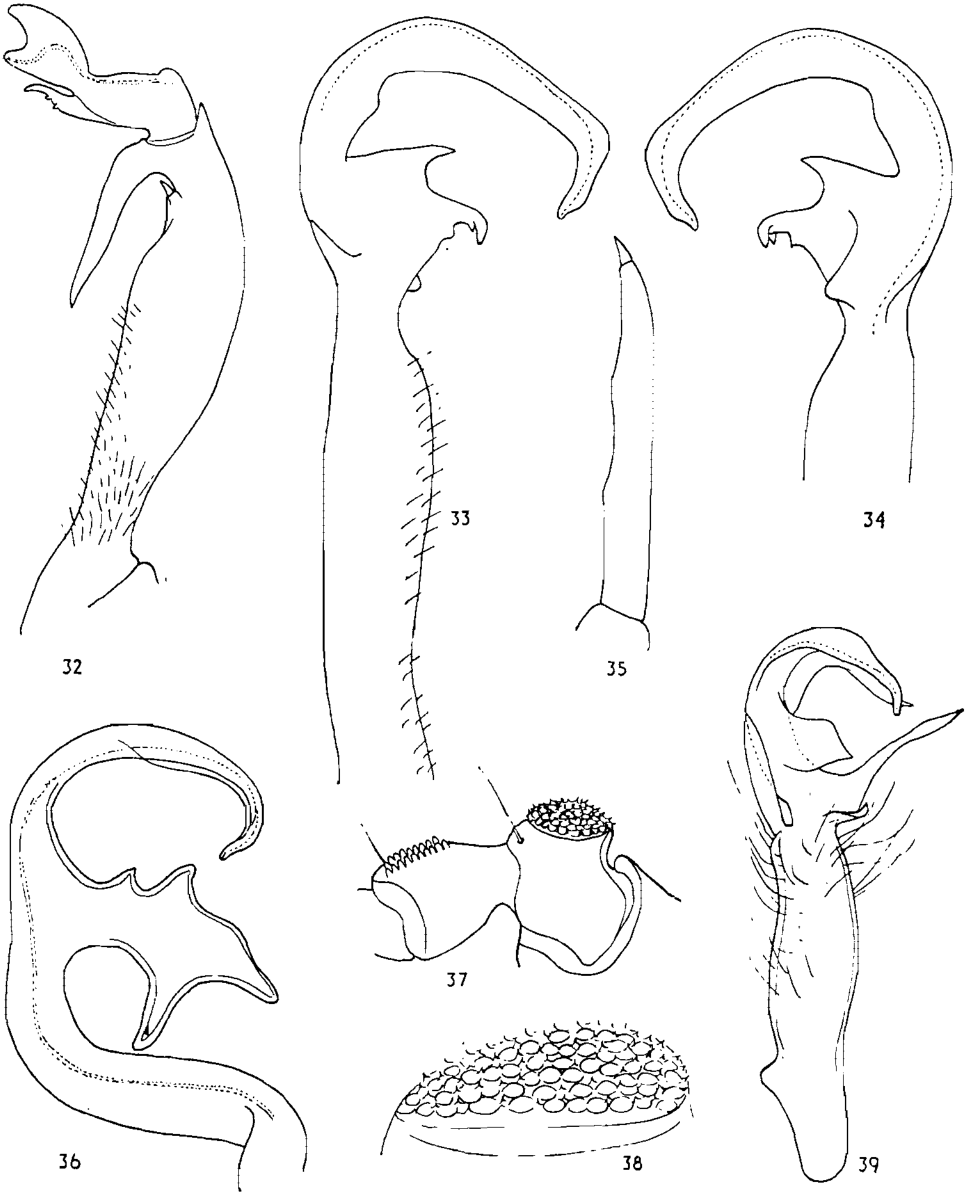
Dimensions.—Length of body of ♂ 19, of ♀ 19 mm. ; greatest width of ♂ 2, of ♀ 2·6 mm.

The species differs from *G. rudebecki* in the posterior tarsi which have no ventral cones while those of *rudebecki* have many in the basal two-thirds of these segments.

Gnomeskelus trichardti n. sp. Text-fig. 36.

Holotypes : 1 ♂, 2 ♀ (N.M. 7714), Hanglip Mt., Louis Trichardt, at 4–5,000 ft. altitude, collected R. F. Lawrence, February 1960.

♂.—*Colour.* Antennæ blackish ; tergites chocolate-brown, variegated with some lighter blotches and a blackish, fairly narrow vertebral stripe ; pores situated in a small light dot, prosomites cream, sternites light reddish-brown, legs dirty white.



TEXT-FIGS. 32–39.

Fig. 32. *Gnomeskelus gonarthrodus* n. sp. ♂; gonopod, aboral view. Figs. 33–35. *Gnomeskelus arator* n. sp. ♂ : 33, gonopod, aboral view ; 34, apex of same, oral view ; 35, tarsus XIII. Fig. 36. *Gnomeskelus trichardti* n. sp. ♂ ; gonopod, aboral view. Figs. 37–39. *Rhopaloskelus longisetosus* n. sp. ♂ : 37, coxa and prefemur VI ; 38, glandular swelling of coxa VI, enlarged ; 39, gonopod, aboral view.

Dorsal surface.—Antennæ fairly long and slender, reaching to posterior margin of tergite IV, segment III longer than II, V the next longest.

Body segment II very slightly wider than collum and segment III; II, III and IV of subequal width, V much wider. All keels strong and well developed, the postero-lateral angle a little pointed in V, rounded in all other segments; no minute accessory teeth on posterior margin of metazonites adjacent to the postero-lateral angle. Collum with 3 transverse rows of minute short bristles, remaining tegites with 1 row, except XIX with 2.

Legs.—Leg VI stout, without ventral processes, all segments from prefemur to tarsus with true cones in more than one row (prefemur only in the middle third, tarsus in basal two-thirds) along their ventral margins; all segments of leg XIII considerably longer and relatively more slender than in VI; tarsus without, tibia with 3–4 in distal half, post-femur without, femur and prefemur with 2–3 small smooth cones in distal half.

Gonopods with the telepodite bent twice or three times almost at right angles, no tibio-tarsus, parsolanomerit very large and flattened, a few strong setæ in basal half of femur, text-fig. 36.

♀ as in ♂ but slightly larger and stouter.

Dimensions.—Length of ♂ 17, of ♀ 17·5 mm.; greatest width of ♂ 1·7, of ♀ 1·9 mm.

The species is fairly closely related to *rudebecki* Lawrence from Entabeni, Zoutpansberg, but completely lacks a tibio-tarsus, differing also in the much larger and differently shaped parsolanomerit.

Gnomeskelus tuberosus Attems. Text-fig. 40.

The gonopods of this species show considerable variation in shape and I now consider that the species can be divided into a number of well-marked subspecies. The types came from Margate, Natal, and the gonopods of specimens from this locality (text-fig. 40) and from Port Edward show a very close correspondence with Attems' figures.

I now designate the following new subspecies as follows:

G. tubersosus tridens (text-fig. 41) from Port St. Johns, Cape Province (N.M. 1624).

G. tubersosus eweri (text-figs. 42, 43) from Quolora, Pondoland, Cape Province (N.M. 6187).

G. tuberosus urbanus (text-fig. 44) from Pietermaritzburg, Natal, (NM. 6825, 3985, 3986).

G. tuberosus clivicolus (text-fig. 45) from Umgeni river, Valley of a Thousand Hills near Drummond (NM. 2667, 7704).

G. tuberosus microdens (text-fig. 46) from Dukuduku forest, Richards Bay and Mtunzini, all Zululand localities (NM. 6808–6810, 4026, 6191, 8131).

In addition Verhoeff's species, *falcifer* (text-fig. 47) can hardly be considered other than a subspecies of the typical *tuberosus*. These seven subspecies can be distinguished by the following key based on the gonopods.

1. Femur of gonopod without tibio-tarsus . . . . . . *falcifer* Verhoef
— Gonopod femur with a small tibio-tarsus 2
2. Femur with a small triangular tooth just below the origin of the parsolanomerit on inner side 3
— Femur without such a tooth 5
3. Canal branch long, slender, almost the same width throughout . . *tuberosus* Attems
— Canal branch either swollen in the middle, or expanded apically or with a large tooth-like process on its lower margin 4
4. Canal branch without a large, tooth-like process on lower margin ; parsolanomerit with its lower margin serrated . . . . *tridens* n. subsp.
— Canal branch with a large tooth-like process on lower margin ; parsolanomerit not serrated . . . . *eweri* n. subsp.
5. Parsolanomerit bluntly rounded at apex ; canal branch wide in its distal two-thirds *urbanus* n. subsp.
— Parsolanomerit pointed at apex ; canal branch slender 6
6. Canal branch of almost equal width throughout ; parsolanomerit with 1 tooth on lower margin . . . . *clivicolus* n. subsp.
— Canal branch wider in the middle and near its apex ; parsolanomerit with 2 small teeth on lower margin . . . . *microdens* n. subsp.

Gnomeskelus triseriatus (Attems).

Pelmatotylus triseriatus Attems 1938, Proc. Zool. Soc. Lond.,**108** : 376, figs. 10–13.
Gnomeskelus triseriatus (Attems), Das Tierreich, Lief **70** : 405, fig. 1569, 1940.

I am very grateful to Dr. Richard L. Hoffman of Blacksburg, U.S.A., who in June 1960 drew my attention to the peculiar geographical distribution of the above species which appeared to be the only form of *Gnomeskelus* known from Hawai while all the remaining members of this large genus were indigenous to South Africa. On looking up the original description (loc. cit., p. 376) it was apparent, for reasons given in the following paragraph, that the species was not Hawaiian in origin but South African and derived from a locality near Pietermaritzburg, Natal.

The name of the collector of the species given by Attems was G. Rump, while that of the late Caretaker of the Natal Museum was Mr. W. G. Rump, an experienced field collector of many years standing. The study catalogue books of the Museum showed that Mr. Rump collected at Impolweni, a small railway siding 13 miles north-west of Pietermaritzburg, in December 1934. The concluding line of Attems' description of 1938, " Fundort : Impolvani (coll. G. Rump, 1934)," is thus explained. Dr. Attems had previously been sent the whole Myriopod collection of the Natal Museum which in 1934 formed the basis of his monograph " The Myriopoda of Natal and Zululand ", ' Ann. Natal Museum ', vol. **8**, pt. 3 ; the material from Impolweni was sent on to Dr. Attems after the main collection had been returned to the Natal Museum and was mistakenly included in material from Hawai.

The species *triseriatus* (Attems) like *serratus* Verhoeff is obviously fairly closely related to *tuberosus* Attems in the shape of the gonopod, differing from it in the much larger tibio-tarsus. The types were not returned to the Museum and I have not yet been able to see specimens with gonopods corresponding exactly to Attems' figures.

Another locality transposition has without doubt occurred in the case of the genus *Pagioprium* Attems a species of which was described by Attems (1944, p. 239) from Ontjo (= Outjo), Kaokoveld, S.W. Africa. It is extremely unlikely that this genus, hitherto known only from Indonesia and Ceylon, should occur in the semi-desert regions of South West Africa as has been pointed out also by Schubart (1956, pp. 22, 81, 82). Polydesmoidea are scarce in the Kaokoveld and I collected almost all of those found in the neighbourhood of Outjo during the South African Museum's two expeditions to the Kaokoveld in 1925 and 1926 ; this material was later sent to Dr. Attems for identification. Such a peculiar genus as *Pagioprium* with its extremely attenuated antennæ and legs would have been memorable and striking at the time of collecting.

The new form of *Podochresimus*, *P. unistolonus*, described by Attems from the same region (*loc. cit.*, p245) is labelled Besfontein, Camacis, but was obviously collected at Sesfontein and Camaeis (or Caimaeis), both being localities visited by the South African Museum's expeditions to the Kaokoveld.

Genus *Rhopaleskelus* Verhoeff.

Rhopaloskelus longisetosus n. sp. Text-figs. 37–39.

Holotypes : 1 ♂, 1 ♀, paratypes, 45 ♂ ♀ (N.M. 8123), Geikies Farm, Rietvlei distr., Natal, collected R. F. Lawrence, November 1960.

♂.—*Colour* reddish-brown, posterior margins of tergites blackish brown, prozonites very light brown, head white ; segments I–IV of antennæ brown, contrasting strongly with V–VII which are dead white ; legs light reddish brown, much lighter than body.

Dorsal surface.—Antennæ long, surpassing posterior margin of metazonite V, segment VII much wider than the others, 1½ times as wide as segment V, II, III and VI subequal in length. Metazonite V much wider than the 4 anterior ones which are subequal in width, tergites quite smooth above and more or less shiny ; collum with 4, remaining metazonites with 2 transverse rows of minute, fine setæ ; no true keels but segments II–IV more or less pointed at their postero-lateral angles, V quite rounded behind, successive metazonites with the postero-lateral tooth more or less pointed, largest in the middle segments but thereafter decreasing in size again ; no minute accessory teeth on the posterior margin near the postero-lateral angle of the metazonites.

Legs.—Tarsus of posterior leg of segment VI with contiguous rows of closely packed lens-shaped transparent cones, except at base of claw ; tibia and postfemur with similar cones, femur with only a single row of about 13 spaced cones, prefemur with 2 short regular rows in distal half; coxa much swollen on inner side as in text-figs. 37, 38, the swelling apparently glandular, covered with flattened lens-shaped discs, with short sharp spicules between them. Tarsus of leg XIII with a few large flat lens-shaped cones in the middle, tibia with two rows of 4 each, post-femur with two rows of 3 each, femur with 8 widely separated cones, prefemur with two rows of 8 contiguous cones.

Gonopod as in text-fig. 39, resembling that of *pietermaritzburgensis* Schubart but easily distinguished from it by the deeply divided canal branch and the long setæ at the base of the tibio-tarsus and parsolanomerit, these very long, stout and bent in the middle at right angles (see Schubart, 1956, p. 74, figs. 43–47).

♀ as in ♂ but slightly shorter and stouter.

Dimensions.—Total length of ♂ 10·5, of ♀ 9·3 mm.; greatest width of ♂ 0·9, of ♀ 1·1 mm.

The species is very probably the same as the juvenile ♀ mentioned by O. Schubart (1956, p. 74) collected by Hanström at Karkloof, which is quite near the type locality of *longisetosus*.

Genus *Allawrencius* Verhoeff.

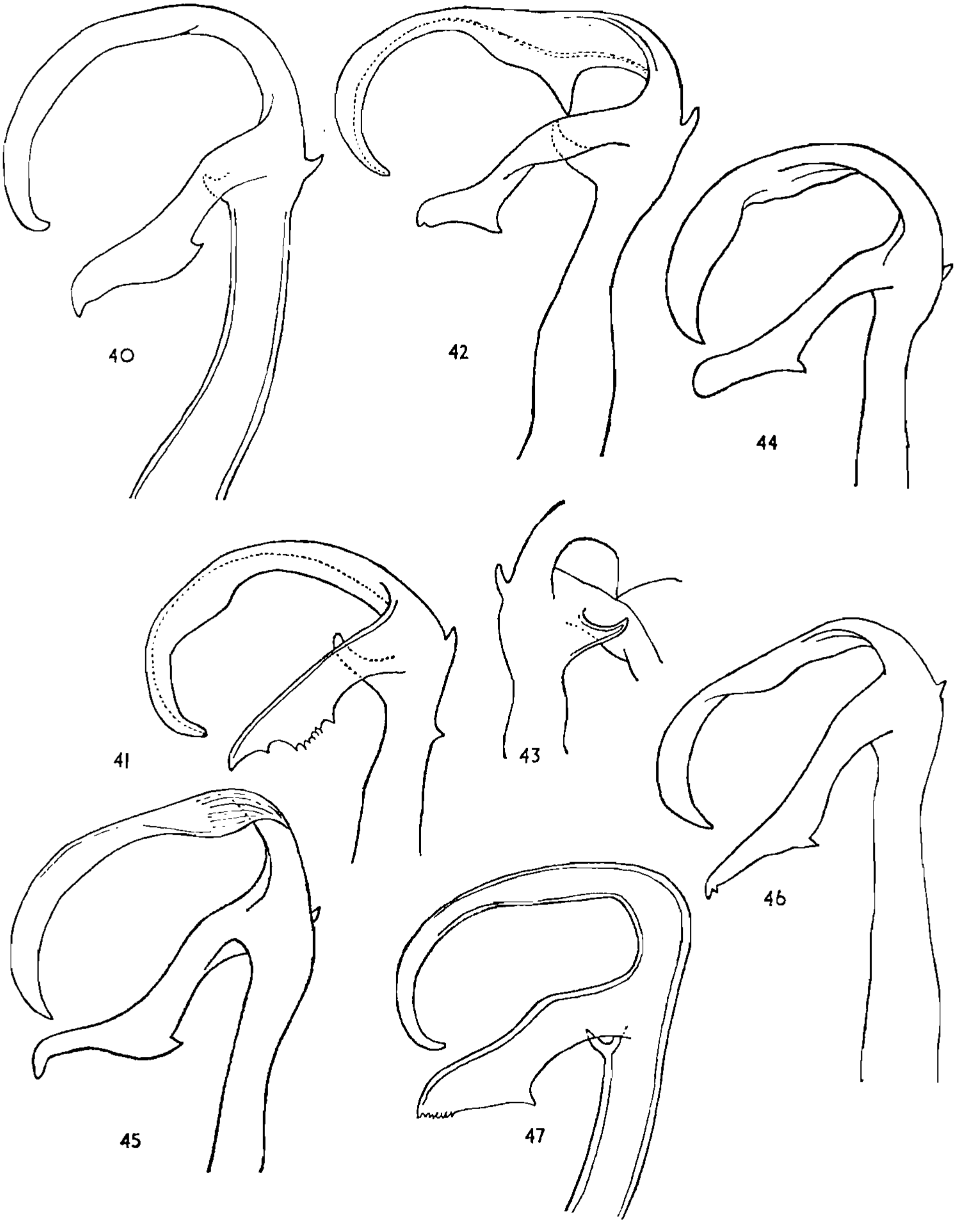
Allawrencius verrucosus n. sp. Text-figs. 48–51.

Holotypes: 1 ♂, 2 ♀ (N.M. 7827), Ngeli Forest, near Kokstad, collected J. Y. Lawrence, January 1960.

♂.—*Colour* earthy reddish-brown, antennæ darker brown, legs dirty cream-coloured.

Dorsal surface.—Antennæ normal, segments V and VI distinctly wider than the others from the side, VI the widest. Second body segment a little wider than collum and segments III and IV but considerably less so than V, the keels quadrangular in outline seen from above; remaining metazonites, text-fig. 51, with 3 rows of rounded wart-like tubercles, those of anterior and posterior rows small, of the middle row much larger and elongate, all tipped with a rod-like seta; anterior row of 6 tubercles separated from the two other rows of 8 each by a shallow groove; keels with two notches and 3 short teeth along their margins, the anterior and posterior with a seta, the middle without; postero-lateral angle pointed but not produced into a tooth except slightly in the middle segments.

Legs.—Anterior legs stouter than the posterior ones, VI with the tarsus of almost uniform width, seen from the side, its entire length, except at base of claw, with numerous cones in several rows, tibia and post-femur with distinctly fewer, femur with a row of only 8 widely separated cones, prefemur with a row of 15 contiguous ones; leg XIII with tarsus strongly attenuated distally, three times as wide at base as at apex, 2 rows of about 16 modified cones

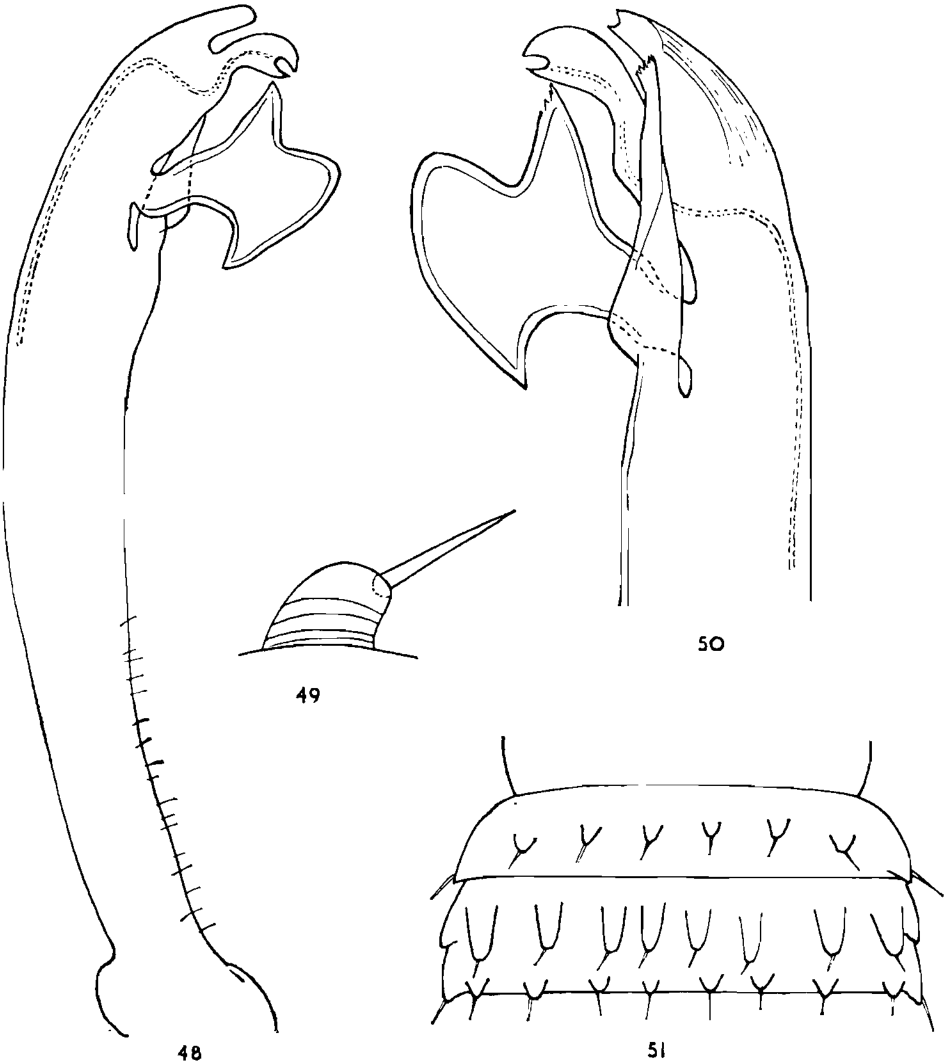


TEXT-FIGS. 40–47.

Figs. 30–47. Right gonopod (aboral view) of : 40, *Gnomeskelus tuberosus tuberosus* Attems ; 41, *G. tuberosus tridens* n. subsp. ; 42, 43, *G. tuberosus eweri* n. subsp. (43, oral view of femoral tooth) ; 44, *G. tuberosus urbanus* n. subsp. ; 45, *G. tuberosus clivicolus* n. subsp. ; 46, *G. tuberosus microdens* n. subsp. ; 47, *G. tuberosus falcifer* Verhoeff. (Fig. 47 after Verhoeff.)

occupying its almost entire length, these (sphere-bristles) ending in a sharp dagger-like spine, text-fig. 49, a few smooth (unspined) cones on tibia, postfemur, femur, more numerous on prefemur (an irregularly duplicated row of about 10).

Gonopods of unusual length, the femur fairly slender, curved regularly



Text-figs. 48–51.

Figs. 48–51. *Allawrencius verrucosus* n. sp. ♂ ; 48, gonopod, aboral view ; 49, sphere bristle of ventral surface of tarsus XIII ; 50, apex of gonopod, oral view (enlarged) ; 51, metazonite of segment IX from above.

inwards, an inner femoral spine at the base of parsolanomerit passing straight upwards behind the telepodite, text-fig. 48, the parsolanomerit a lamellate hatchet-shaped structure ; sperm canal issueing from a pincer-shaped process at apex of telepodite ; no tibio-tarsus, text-fig. 50.

♀ not differing from the ♂ except in the relatively thicker body.

Dimensions.—Total length of ♂ 12·5, of ♀ 12 mm. ; greatest width of ♂ 1·4, of ♀ 1·6 mm.

KEY TO THE SPECIES OF *Allawrencius* (MALES).

1. Tergites with 2 transverse rows of tubercles, each with a bristle 2

— Tergites with 3 transverse rows of tubercles, with or without a bristle . . . 3

2. Metazonites with rows of 10 or 12 tubercles ; gonopods much widened apically, at least one branch (tibio-tarsus) directed laterally . . . . *teres* (Attems)

— Metazonites with rows of 16 tubercles ; gonopods not widened apically, with numerous branches all directed medially . . . . *gladiator* Lawrence

3. Tubercles of the tergites with a bristle ; rows of tergites with 6–8 tubercles ; keels seen from above with 2 notches containing bristles 4

— Tubercles of the tergites without a bristle ; rows of tergites with 9–17 tubercles ; keels smooth without notches or bristles 5

4. Gonopods short, thickened and straight ; canal branch of telepodite accompanied by a long curved spine ; tarsus of legs of middle segments without spherical nodules *incisus* Lawrence

— Gonopods long, slender, curved regularly inwards ; canal branch of telepodite without a long spine ; tarsus of middle legs with spherical seta-tipped nodules *verrucosus* Lawrence

5. Tergites with only 2 distinct transverse rows of small tubercles, the third one (except in anterior segments) very indistinct ; tibio-tarsus of gonopods very large, without an inner tooth, canal branch with a strong tooth . . . . *complex* Lawrence

— Tergites with 3 well-developed transverse rows of tubercles ; tibio-tarsus of gonopod with 1–2 inner teeth, canal branch without an outer tooth 6

6. Tergites entirely covered with tubercles as far as the lateral margins, in rows of 13 or 17 ; tibio-tarsus of gonopod describing more than a semi-circle and considerably surpassing the canal branch ; body length 16 mm. . . . *triordinatus* Lawrence

— Tergites with a smooth space near lateral margins, tubercles in rows of 9 or 10 ; tibio-tarsus describing less than a semi-circle, hardly surpassing the canal branch ; body length 19–25 mm. . . . . *nodulosus* Verhoeff

NEW RECORDS OF SPHÆROTRICHOPIDÆ

Gnomeskelus retrusus Schubart.

Numerous ♂ ♀ in Town Bush, Pietermaritzburg (N.M. 8166, 7840).

Gnomeskelus brincki Schubart.

1 ♂ (N.M. 7825), Mamathes, Basutoland.

Gnomeskelus glaber Lawrence.

Numerous ♂ ♀ (N.M. 7691, 7701), Umgeni river, Valley of a Thousand Hills, near Drummond.

Gnomeskelus tenuipes Lawrence.

1 ♂, 3 ♀ (N.M. 6198), Gwaliweni forest, Zululand.

Gnomeskelus natalicus Attems.

Dukuduku forest, Zululand (N.M. 8161); Sheffield Beach, Umhlali (N.M. 7853); St. Helier, near Pinetown, Natal (N.M. 6769).

Gnomeskelus bifurcatus Lawrence

12 ♂ ♀ (N.M. 7230), Enon forest, Richmond, Natal.
1 ♂ (N.M. 6765), Swartkops, near Cedara, Natal, ± 4,000 ft. alt.

Gnomeskelus circulipes Verhoeff.

1 ♂ (N.M. 6740), Swartkops, near Cedara, Natal, ± 4,000 ft. altitude.

Gnomeskelus attemsi Verhoeff.

1 ♂ (N.M. 6743), Swartkops, near Cedara, Natal, ± 4,000 ft. altitude.

Rhopaleskelus pietermaritzburgensis Schubart.

12 ♂ ♀ (N.M. 8165), Town Bush, Pietermaritzburg.

Rhopaleskelus terreus (Attems).

5 ♂ ♀ (N.M. 7845), Sheffield Beach, Umhlali, Natal.
1 ♂ (N.M. 6831), Swartkops, near Cedara, Natal, ± 4,000 ft. altitude.

Allawrencius complex Lawrence.

Numerous ♂ ♀ from the Ngomi forest, Zululand (N.M. 8144) and Kranskop forest, Natal (N.M. 6213).

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